

What is claimed is:

1. A thin film EL device comprising at least:
a hole-injecting electrode;
an electron-injecting electrode opposed to said hole-injecting electrode;
5 and
a luminescent layer sandwiched between said hole-injecting electrode
and said electron-injecting electrode, said luminescent layer
containing a charge-transport luminescent material having,
within a molecule, a portion contributing to charge transport and
10 a portion contributing to luminescence where at least two
molecular orbitals contributing to luminescent transition are
localized.
2. A thin film EL device according to claim 1, wherein an electron
cloud of said portion contributing to charge transport and an electron cloud
15 of said portion contributing to luminescence are localized such that said
electron clouds substantially do not overlap each other.
3. A thin film EL device according to claim 1, wherein said portion
contributing to charge transport and said portion contributing to
luminescence are connected by a carbon-carbon bond.
- 20 4. A thin film EL device according to claim 1, wherein said
charge-transport luminescent material is a compound having an asymmetric
and nonplanar molecular structure.

5. A thin film EL device according to claim 1, wherein said portion contributing to luminescence is present within said luminescent layer at 1×10^{20} to 1×10^{21} per 1 cm^3 .

6. A thin film EL device according to claim 1, wherein the volume ratio
5 of said portion contributing to luminescence is lower than that of said portion contributing to charge transport.

7. A thin film EL device according to claim 1, wherein said portion contributing to charge transport is of a diaryl diphenyl arylenediamine skeleton.

10 8. A thin film EL device according to claim 7, wherein said diaryl diphenyl arylenediamine skeleton is a tetraphenyl phenylenediamine skeleton.

9. A thin film EL device according to claim 1, wherein said portion contributing to luminescence is an aryl group containing five or more
15 conjugated bonds.

10. A thin film EL device according to claim 9, wherein said aryl group containing five or more conjugated bonds is of an anthracene skeleton.

11. A thin film EL device according to claim 1, wherein an electron-donating substituent is directly bonded to said portion contributing
20 to luminescence.

12. A thin film EL device according to any one of claims 1-11, wherein said charge is a hole.

13. A thin film EL device comprising at least:

a hole-injecting electrode;

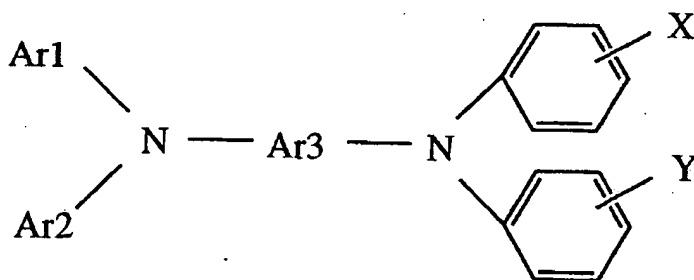
5 an electron-injecting electrode opposed to said hole-injecting electrode;

and

a luminescent layer sandwiched between said hole-injecting electrode and said electron-injecting electrode, said luminescent layer containing a compound represented by the following general formula (1):

10

(1)



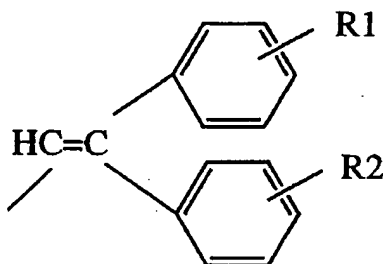
where Ar1 and Ar2 may be the same or different, and each independently represents a substituted or unsubstituted aryl group; Ar3 represents a substituted or unsubstituted arylene group; X represents a substituent containing two or more carbon rings and non-planarly bonding to a diphenylamine portion; and Y represents a substituted or unsubstituted aryl group containing five or more conjugated bonds.

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14. A thin film EL device according to claim 13, wherein said compound represented by the general formula (1) has a portion contributing to luminescence where at least two molecular orbitals contributing to luminescent transition are localized.

5 15. A thin film EL device according to claim 13, wherein said X in the general formula (1) is a substituent represented by the following general formula (2):

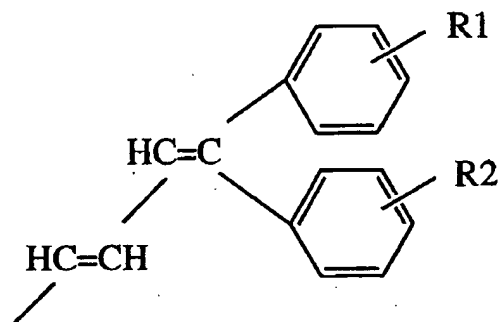
(2)



10 where R1 and R2 may be the same or different, and each independently represents a hydrogen atom or an alkyl group.

16. A thin film EL device according to claim 13, wherein said X in the general formula (1) is a substituent represented by the following general formula (3):

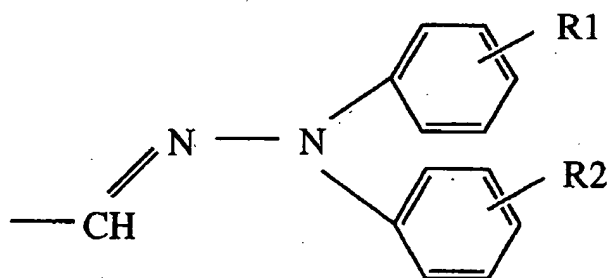
(3)



where R1 and R2 may be the same or different, and each independently represents a hydrogen atom or an alkyl group.

- 5 17. A thin film EL device according to claim 13, wherein said X in the general formula (1) is a substituent represented by the following general formula (4):

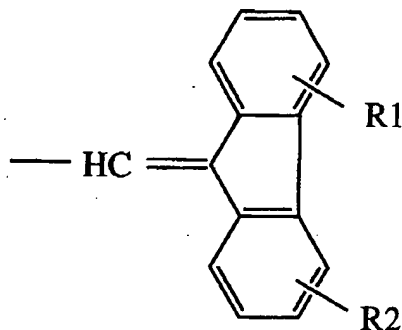
(4)



- 10 where R1 and R2 may be the same or different, and each independently represents a hydrogen atom or an alkyl group.

18. A thin film EL device according to claim 13, wherein said X in the general formula (1) is a substituent represented by the following general formula (5):

(5)



where R1 and R2 may be the same or different, and each independently represents a hydrogen atom or an alkyl group.

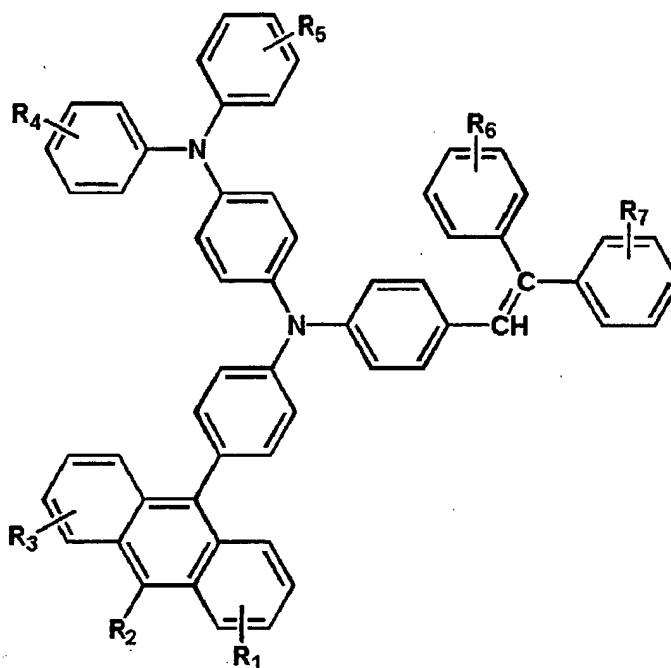
5 19. A thin film EL device according to claim 13, wherein said Y in the general formula (1) is an aryl group substituted with an electron-donating substituent.

20. A thin film EL device according to claim 13, wherein said Ar3 in the general formula (1) is a p-phenylene group.

10 21. A thin film EL device according to claim 13, wherein said Ar3 in the general formula (1) is an m-phenylene group.

22. A thin film EL device according to claim 13, wherein said hole-transport luminescent material is a compound represented by the following general formula (6):

(6)



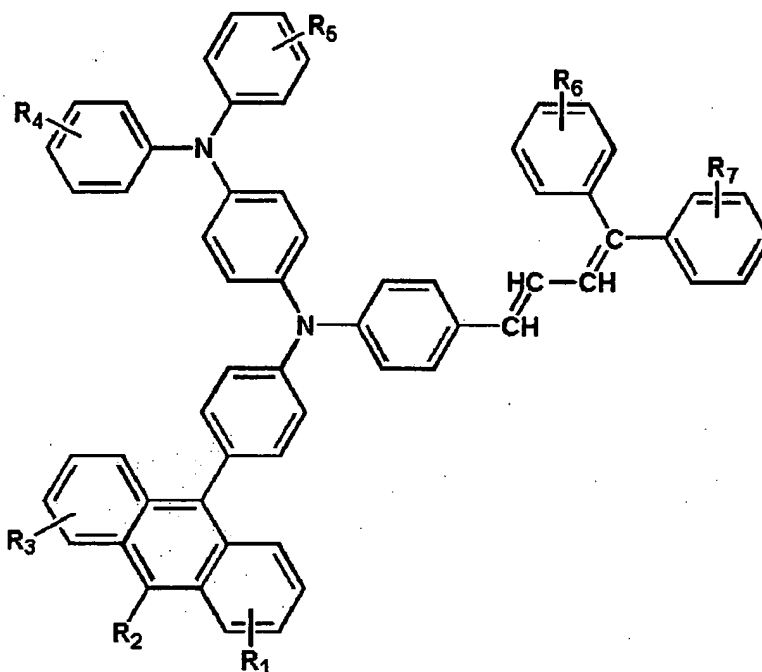
where R4, R5, R6, and R7 may be the same or different, and each independently represents a hydrogen atom, an alkyl group, or an alkoxy group; and R1, R2, and R3 may be the same or different, and each independently represents a hydrogen atom or an electron-donating substituent.

23. A thin film EL device according to claim 22, wherein said compound represented by the general formula (6) is (4-{[4-(2,2-diphenylvinyl)phenyl]
[4-(9-anthryl)phenyl]amino}phenyl)diphenylamine.

24. A thin film EL device according to claim 22, wherein said compound represented by the general formula (6) is (4-{[4-(2,2-diphenylvinyl)phenyl][4-(10-methoxy(9-anthryl))phenyl]amino}phenyl)diphenylamine.

25. A thin film EL device according to claim 13, wherein said hole-transport luminescent material is a compound represented by the following general formula (7):

(7)



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where R₄, R₅, R₆, and R₇ may be the same or different, and each independently represents a hydrogen atom, an alkyl group, or an alkoxy group; and R₁, R₂, and R₃ may be the same or different, and each independently represents a hydrogen atom or an electron-donating substituent.

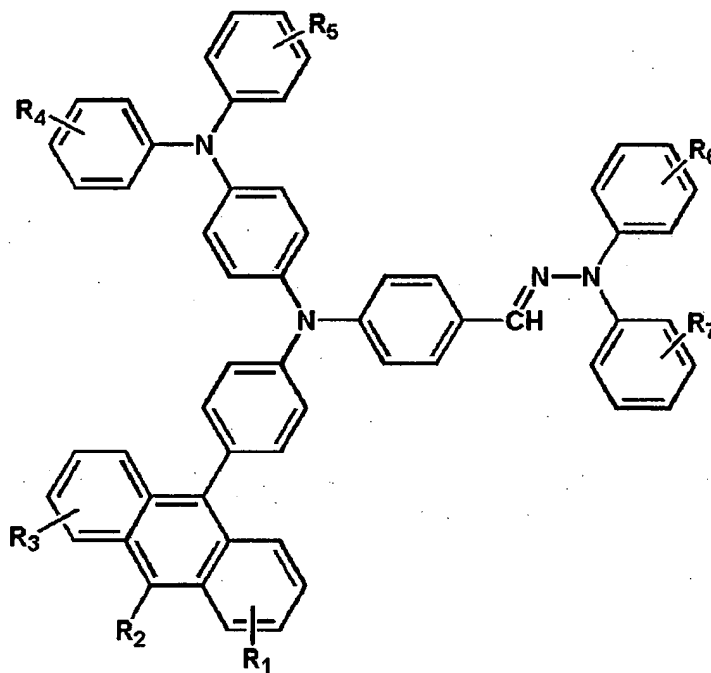
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26. A thin film EL device according to claim 25, wherein said compound represented by the general formula (7) is (4-{[4-(4,4-diphenylbuta-1,3-dienyl)phenyl][4-(9-anthryl)phenyl]amino}phenyl)diphenylamine.

27. A thin film EL device according to claim 25, wherein said compound represented by the general formula (7) is (4-{[4-(4,4-diphenylbuta-1,3-dienyl)phenyl][4-(10-methoxy(9-anthryl))phenyl]amino}phenyl)diphenylamine.

28. A thin film EL device according to claim 13, wherein said
5 hole-transport luminescent material is a compound represented by the following general formula (8):

(8)



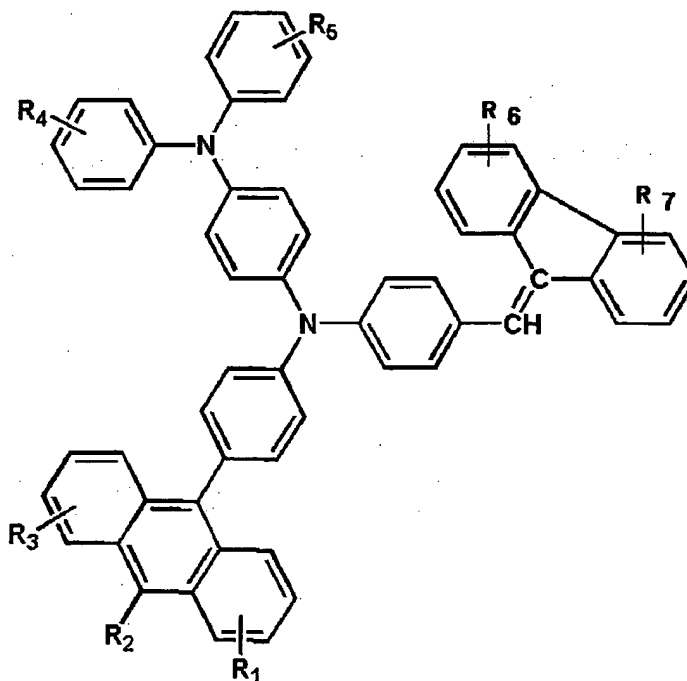
where R₄, R₅, R₆, and R₇ may be the same or different, and each
10 independently represents a hydrogen atom, an alkyl group, or an alkoxy group; and R₁, R₂, and R₃ may be the same or different, and each independently represents a hydrogen atom or an electron-donating substituent.

29. A thin film EL device according to claim 28, wherein said compound represented by the general formula (8) is [4-({4-[2-aza-2-(diphenylamino)vinyl]phenyl}{4-(9-anthryl)phenyl}amino)phenyl]diphenylamine.

30. A thin film EL device according to claim 28, wherein said compound
5 represented by the general formula (8) is [4-({4-[2-aza-2-(diphenylamino)
vinyl]phenyl}{4-(10-methoxy(9-anthryl))phenyl}amino)phenyl]
diphenylamine.

31. A thin film EL device according to claim 13, wherein said
hole-transport luminescent material is a compound represented by the
following general formula (9):

(9)



where R4, R5, R6, and R7 may be the same or different, and each

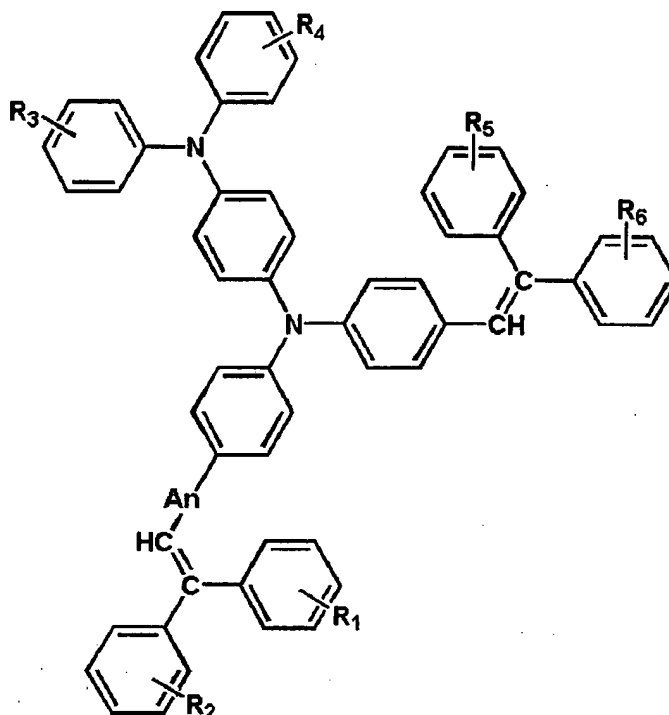
independently represents a hydrogen atom, an alkyl group, or an alkoxy group; and R1, R2, and R3 may be the same or different, and each independently represents a hydrogen atom or an electron-donating substituent.

5 32. A thin film EL device according to claim 31, wherein said compound represented by the general formula (9) is (4-{[4-(fluorene-9-ylidenmethyl)phenyl][4-(9-anthryl)phenyl]amino}phenyl)diphenylamine.

33. A thin film EL device according to claim 31, wherein said compound represented by the general formula (9) is (4-{[4-(fluorene-9-ylidenmethyl)phenyl][4-(10-methoxy(9-anthryl))phenyl]amino}phenyl)diphenylamine.
10

34. A thin film EL device according to claim 13, wherein said hole-transport luminescent material is a compound represented by the following general formula (10):

(10)



where R₁, R₂, R₃, R₄, R₅, and R₆ may be the same or different, and each independently represents a hydrogen atom, an alkyl group, or an alkoxy group; and An represents an arylene group composed of two or more substituted or unsubstituted fused rings.

35. A thin film EL device according to claim 34, wherein said compound represented by the general formula (10) is [4-({4-[10-(2,2-diphenylvinyl)(9-anthryl)]phenyl}[4-(2,2-diphenylvinyl)phenyl]amino)phenyl]diphenylamine.

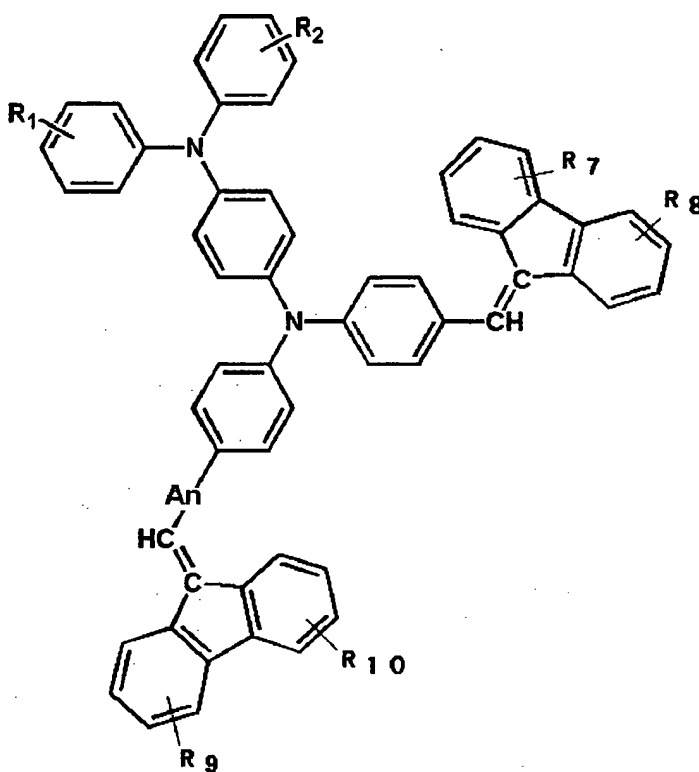
36. A thin film EL device according to claim 34, wherein said compound represented by the general formula (10) is [4-({4-[10-(2,2-diphenylvinyl)(9-anthryl)]phenyl}{4-(2,2-diphenylvinyl)phenyl}amino)phenyl]bis(4-

methoxyphenyl)amine.

37. A thin film EL device according to claim 13, wherein said hole-transport luminescent material is a compound represented by the following general formula (11):

5

(11)



where R₁, R₂, R₇, R₈, R₉, and R₁₀ may be the same or different, and each independently represents a hydrogen atom, an alkyl group, or an alkoxy group; and An represents an arylene group composed of two or more substituted or unsubstituted fused rings.

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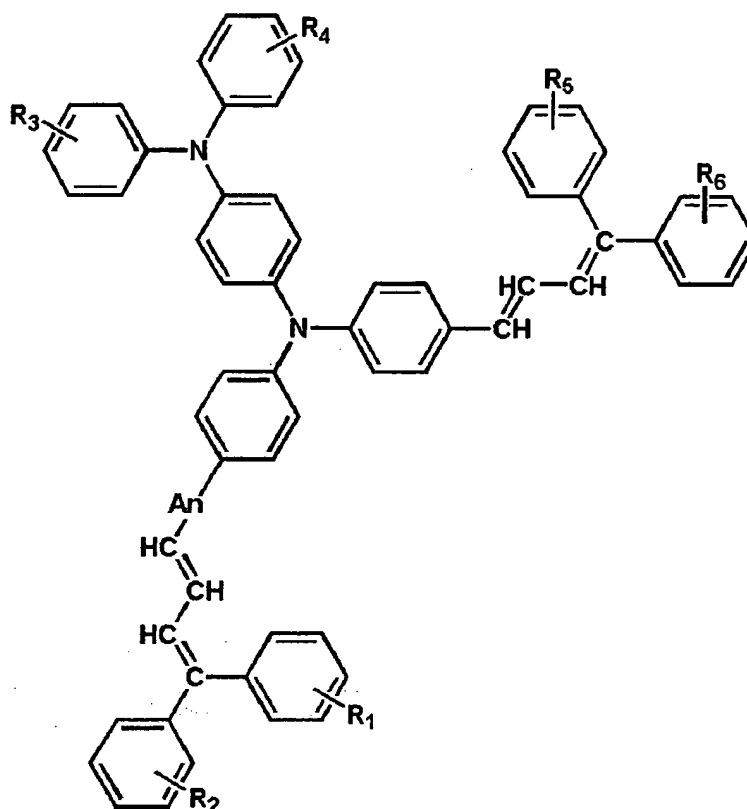
38. A thin film EL device according to claim 37, wherein said compound

represented by the general formula (11) is [4-({4-[10-(fluorene-9-ylidenmethyl)(9-anthryl)]phenyl}{4-(fluorene-9-ylidenmethyl)phenyl}amino)phenyl]diphenylamine.

39. A thin film EL device according to claim 37, wherein said compound
5 represented by the general formula (11) is [4-({4-[10-(fluorene-9-ylidenmethyl)(9-anthryl)]phenyl}{4-(fluorene-9-ylidenmethyl)phenyl}amino)phenyl]bis(4-methoxyphenyl)amine.

40. A thin film EL device according to claim 13, wherein said
hole-transport luminescent material is a compound represented by the
10 following general formula (12):

(12)



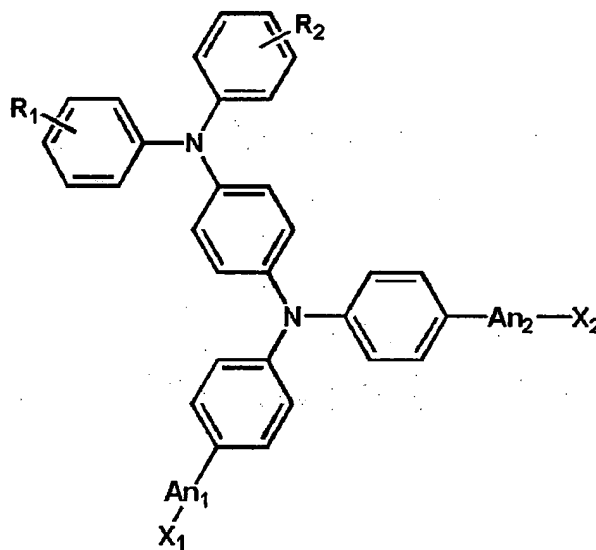
where R₁ and R₂ may be the same or different, and each independently represents a hydrogen atom, an alkyl group, or an alkoxy group; and An represents an arylene group composed of two or more substituted or unsubstituted fused rings.

41. A thin film EL device according to claim 40, wherein said compound represented by the general formula (12) is [4-({4-[10-(4,4-diphenylbuta-1,3-dienyl)(9-anthryl)]phenyl}[4-(4,4-diphenylbuta-1,3-dienyl)phenyl]amino)phenyl]diphenylamine.

42. A thin film EL device according to claim 40, wherein said compound represented by the general formula (12) is [4-({4-[10-(4,4-diphenylbuta-1,3-dienyl)(9-anthryl)]phenyl}{4-(4,4-diphenylbuta-1,3-dienyl)phenyl}amino)phenyl]bis(4-methoxyphenyl)amine.

5 43. . A thin film EL device according to claim 13, wherein said hole-transport luminescent material is a compound represented by the following general formula (13):

(13)



10 where R₁ and R₂ may be the same or different, and each independently represents a hydrogen atom, an alkyl group, or an alkoxy group; An₁ and An₂ may be the same or different, and each independently represents an arylene group composed of two or more substituted or unsubstituted fused rings; and X₁ and X₂ may be the same or different, and each independently
15 represents a substituted or unsubstituted 2,2-diphenylvinyl group,

4,4-diphenylbuta-1,3-dienyl group, or fluorene-9-ylidenmethyl group or a hydrogen atom.

44. A thin film EL device according to claim 43, wherein said compound represented by the general formula (13) is {4-[bis(4-(9-anthryl)phenyl) amino]phenyl}diphenylamine.

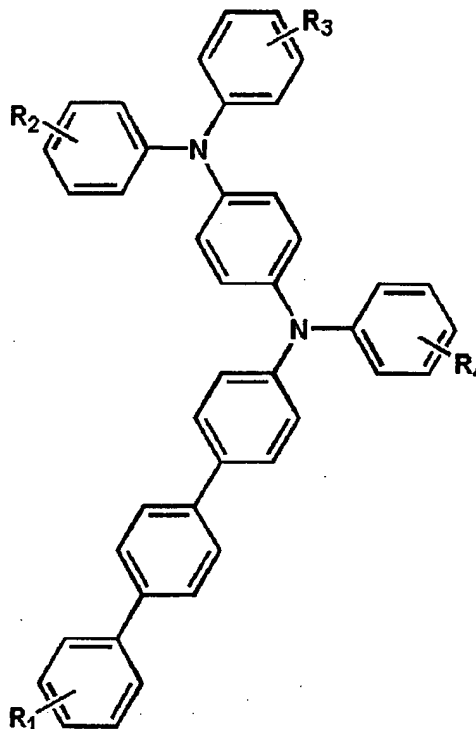
45. A thin film EL device according to claim 43, wherein said compound represented by the general formula (13) is [4-(bis{4-[10-(2,2-diphenylvinyl) (9-anthryl)]phenyl}amino)phenyl]diphenylamine.

46. A thin film EL device according to claim 43, wherein said compound represented by the general formula (13) is [4-(bis{4-[10-(4,4-diphenylbuta-1,3-dienyl)(9-anthryl)]phenyl}amino)phenyl]diphenylamine.

47. A thin film EL device according to claim 43, wherein said compound represented by the general formula (13) is [4-(bis{4-[10-(fluorene-9-ylidenmethyl)(9-anthryl)]phenyl}amino)phenyl]diphenylamine.

48. A thin film EL device according to claim 13, wherein said hole-transport luminescent material is a compound represented by the following general formula (14):

(14)



where R4 represents a hydrogen atom, an alkyl group, an alkoxy group, or an aralkyl group; and R1, R2, and R3 may be the same or different, and
 5 each independently represents a hydrogen atom, an alkyl group, or an alkoxy group.

49. A thin film EL device according to claim 48, wherein said compound represented by the general formula (14) is [4-(diphenylamino)phenyl][4-(4-phenylphenyl)phenyl]phenylamine.

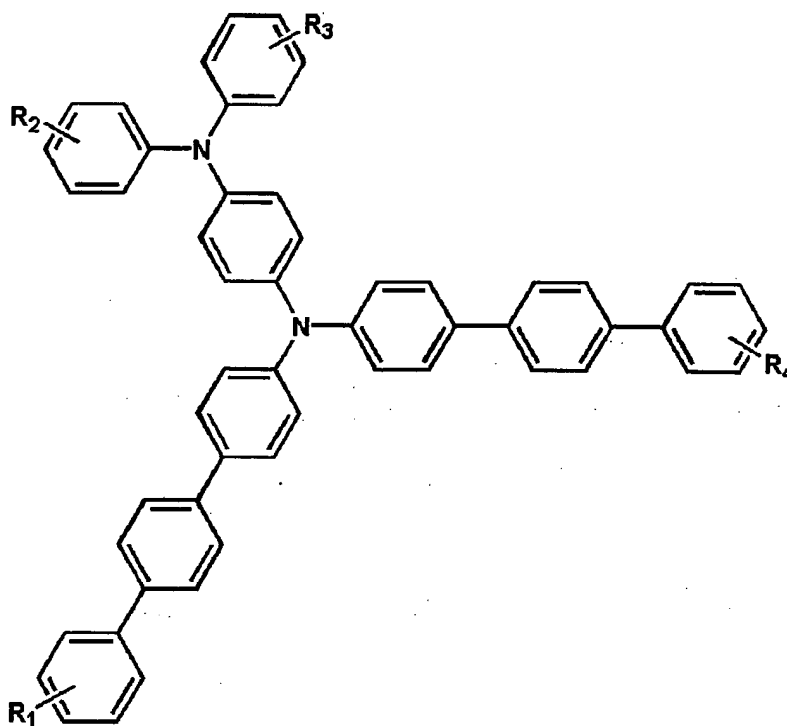
10 50. A thin film EL device according to claim 48, wherein said compound represented by the general formula (14) is [4-{bis(4-methoxyphenyl)amino}phenyl][4-{4-(4-methoxyphenyl)phenyl}phenyl][4-(1-methyl-1-phenylethyl)

phenyl]amine.

51. A thin film EL device according to claim 13, wherein said hole-transport luminescent material is a compound represented by the following general formula (15):

5

(15)



where R1, R2, R3, and R4 may be the same or different, and each independently represents a hydrogen atom, an alkyl group, or an alkoxy group.

10

52. A thin film EL device according to claim 51, wherein said compound represented by the general formula (15) is [4-(diphenylamino)phenyl][bis{4-(4-phenylphenyl)phenyl}]amine.

53. A thin film EL device according to claim 51, wherein said compound represented by the general formula (15) is [4-{bis(4-methoxyphenyl)amino}phenyl]bis[4-{4-(4-methoxyphenyl)phenyl}phenyl]amine.